TABLE OF TRENCHING AND STANDARD BEDDING MATERIAL QUANTITIES

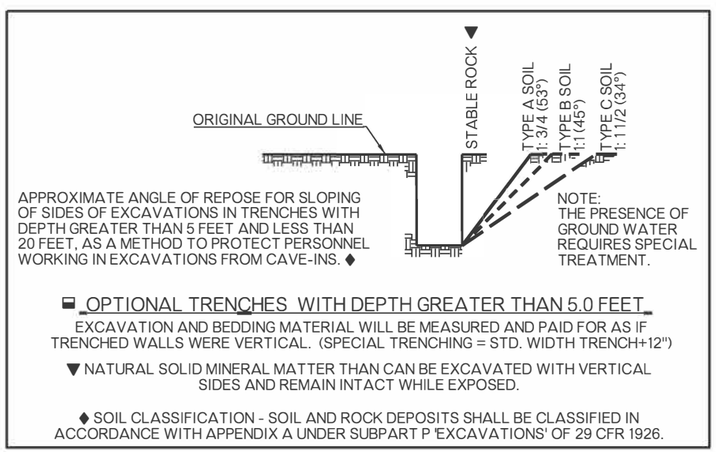
	PIPE DIAM. OR DESIGN EQUIV.	H ■	SINGLE PIPE INSTALLATION		DOUBLE PIPE INSTALLATION		TRIPLE PIPE INSTALLATION		CLEAR SPACE BETWEEN PIPES
			W	STANDARD BEDDING MATERIAL ■	W	STANDARD BEDDING MATERIAL ■	W	STANDARD BEDDING MATERIAL ■	
		FT.	FT.	CY/LF	FT.	CY/LF	FT.	CY/LF	INCHES
ROUND PIPE	18"	3.10	3.20	0.28	6.10	0.52	9.00	1.00	14
	24"	3.60	4.00	0.39	7.70	0.73	11.40	1.50	17
	30"	4.20	4.80	0.51	9.30	0.97	13.80	2.15	20
	36"	4.75	5.50	0.63	10.80	1.23	16.20	2.85	23
	42"	5.30	7.00	0.92	13.20	1.67	19.30	3.80	26
	48"	6.20	7.50	1.03	14.75	2.00	21.70	4.70	29
	54"	6.20	8.00	1.20	15.30	2.20	22.70	5.10	32
	60"	6.75	9.50	1.60	17.60	2.75	25.90	6.30	35
	66"	7.20	10.00	1.70	18.80	3.10	27.70	7.35	38
METAL ARCH PIPE	18"	2.80	3.20	0.27	6.20	0.52	9.20	0.77	14
	24"	3.25	4.00	0.38	7.83	0.74	11.67	1.09	17
	30"	3.60	5.50	0.57	10.20	1.03	14.87	1.49	20
	36"	4.00	6.25	0.69	11.75	1.27	17.25	1.84	23
	42"	4.40	7.00	0.82	13.33	1.53	19.66	2.24	26
	48"	4.80	8.10	1.02	15.35	1.88	22.60	2.75	29
	54"	5.25	9.50	1.32	17.58	2.36	25.66	3.40	32
	60"	5.60	10.00	1.40	18.92	2.62	27.84	3.82	35
	66"	6.00	10.90	1.63	20.65	3.00	30.40	4.39	38

■ FOR PIPES UNDER PAVEMENT, THE H DIMENSION AND THE STANDARD BEDDING MATERIAL QUANTITY, SHALL BE INCREASED TO GO TO THE TOP OF THE TRENCH.

TABLE OF FILL HEIGHTS

	PIPE SIZE		MINIMUM COVER OVER TOP OF PIPE (BUOYANCY)	MAXIMUM COVER		MINIMUM METAL PIPE GAGE REQUIREMENT	
	POLYETH. ROUND	EQUIVALENT METAL ARCH		POLYETHYLENE	METAL	UNDER PAVEMENT	ALL OTHERS
ROUND PIPE	18"	21" x 15"	15"	10'	REFER TO RDY. STANDARD FHTMPP-1	14 ◒	REFER TO RDY. STANDARD FHTMPP-1
	24"	28" x 20"	20"	10'		14 ◒	
	30"	35" x 24"	25"	10'		14 ◒	
	36"	42" x 29"	30"	10'		14	
	42"	49" x 33"	35"	10'		12	
	48"	57" x 38"	40"	10'		12	
	54"	64" x 43"	45"	10'		12	
	60"	71" x 47"	50"	10'		10	
	66"	77" x 52"	55"	N/A		10	

◒ UNDER PAVEMENT IS DEFINED TO INCLUDE ALL P.C. OR A.C. SURFACING UNDER MAINLINE TRAFFIC AND MAJOR STREET RETURNS. A MINIMUM PIPE GAGE OF 16 MAY BE USED FOR INSTALLATIONS REQUIRING 30 INCH EQUIVALENT ROUND CONDUITS (MAX.) AND LIMITED TO LOW VOLUME COUNTY OR OFF-SYSTEM ROADS, MINOR STREET RETURNS, DRIVEWAYS OR TEMPORARY DETOURS, AS APPROVED BY THE ENGINEER.

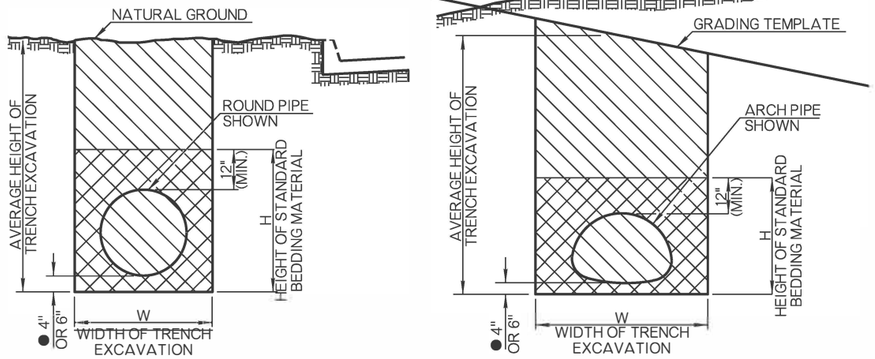


◒ OPTIONAL TRENCHES WITH DEPTH GREATER THAN 5.0 FEET

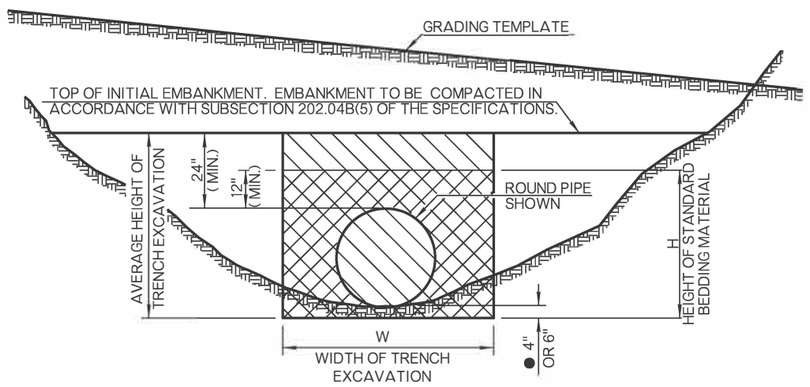
EXCAVATION AND BEDDING MATERIAL WILL BE MEASURED AND PAID FOR AS IF TRENCHED WALLS WERE VERTICAL. (SPECIAL TRENCHING = STD. WIDTH TRENCH+12")

▼ NATURAL SOLID MINERAL MATTER THAN CAN BE EXCAVATED WITH VERTICAL SIDES AND REMAIN INTACT WHILE EXPOSED.

♦ SOIL CLASSIFICATION - SOIL AND ROCK DEPOSITS SHALL BE CLASSIFIED IN ACCORDANCE WITH APPENDIX A UNDER SUBPART P 'EXCAVATIONS' OF 29 CFR 1926.



TRENCH EXCAVATION IN CUT SECTIONS



TRENCH EXCAVATION IN EMBANKMENT SECTIONS

LIMITS OF STANDARD BEDDING MATERIAL. QUANTITIES FOR BEDDING MATERIAL DO NOT INCLUDE THE SPACE WITHIN AND BOUNDED BY THE OUTER SURFACE OF THE PIPE CONDUIT.

LIMITS OF TRENCH EXCAVATION.

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2019 ODOT STANDARD SPECIFICATIONS.
2. TRENCH EXCAVATION & STANDARD BEDDING WILL NOT BE REQUIRED FOR PIPE INSTALLATIONS ON SIDE DRAINS UNLESS OTHERWISE SPECIFIED ON THE PLANS.
3. TRENCH EXCAVATION WILL BE PAID FOR ON PIPE UNDERDRAIN. SEE ROADWAY STANDARD PUD-4.
4. TRENCHING REQUIREMENTS FOR DEPTHS OVER 5 FEET SHALL BE IN ACCORDANCE WITH, & DEFINED BY, O.S.H.A. REGS., TITLE 29 CFR, STANDARDS 1926.650, 1926.651 & 1926.652.
5. NORMAL BACKFILLING OPERATIONS SHALL FOLLOW BEDDING AND PIPE INSTALLATION AS CLOSELY AS PRACTICAL. IN NO CASE SHALL A PIPE INSTALLATION SUBJECT TO SUDDEN FLOW DEVELOPMENT BE LEFT WITHOUT SUFFICIENT BACKFILL TO RESTRAIN THE CONDUIT AND PREVENT JOINT SEPARATION AND/OR PIPING SCOUR. PHYSICALLY RESTRAINING THE CONDUIT MAY BE USED TO AUGMENT OR REPLACE THIS IMMEDIATE BACKFILL REQUIREMENT.
6. ANY EXCESS EXCAVATION NOT USED FOR BACKFILL WILL BECOME THE PROPERTY OF THE CONTRACTOR AND DISPOSED OF, BY HIM, IN A MANNER APPROVED BY THE ENGINEER.
7. INSTALLATION OF FLEXIBLE PIPE SHALL CONFORM TO SECTION 26 - DIVISION II OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.
8. JOINTS IN METAL PIPES SHALL CONFORM TO SECTION 26.4.2.4 OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES. IF A WATERTIGHT JOINT IS SPECIFIED ON THE PLANS, A 12" WIDE BY 3/4" THICK NEOPRENE SLEEVE GASKET MEETING ASTM D1056 REQUIREMENT SHALL BE USED.
9. JOINTS IN CORRUGATED POLETHYLENE PIPES SHALL CONSIST OF A GASKETED SYSTEM WHICH CAN PASS MINIMUM OF 2 PSI HYDROSTATIC TEST WITHOUT LEAKAGE AND CONFORM TO AASHTO M 294▲& SECTION 26.4.2.4 OF AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES. GASKET MATERIAL SHALL CONFORM TO EITHER ASTM D1056 OR ASTM F477 REQUIREMENTS. SIDE DRAINS ARE EXCLUDED FROM THE LEAKAGE RESISTANCE REQUIREMENTS UNLESS OTHERWISE SPECIFIED.
10. TYPE C POLYETHYLENE PIPE SHALL BE USED ONLY IN SIDE-DRAIN & SLIPLINING APPLICATIONS.
11. ■ STANDARD BEDDING MATERIAL QUANTITIES ARE BASED ON THE TRENCH WIDTH (W), TRENCH HEIGHT (H) AND EFFECTIVE DIAMETER (D) OF ROUND CORRUGATED POLYETHYLENE PIPE MEETING THE REQUIREMENTS OF AASHTO M 294 (18"-60").
12. ▲ SPLIT COLLAR COUPLERS ARE NOT APPROVED FOR USE IN ALL CORRUGATED POLYETHYLENE PIPE INSTALLATIONS.
13. ● EQUIVALENT PIPE SIZES 66 INCHES AND LARGER REQUIRE 6 INCHES OF BEDDING MATERIAL BELOW PIPE CONDUIT.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
613 (R)	STANDARD BEDDING MATERIAL, CLASS A	CY
613 (S)	STANDARD BEDDING MATERIAL, CLASS B	CY
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY
613 (V)	TRENCH EXCAVATION	CY

APPROVED BY ROADWAY ENGINEER: RG DWE DATE: 6/30/22

ROADWAY DESIGN DIVISION STANDARD

FLEXIBLE PIPE INSTALLATION

OKLAHOMA Transportation

2019 SPECIFICATIONS

FPI-4 | 2

R-60